Saamagaana
The First Melody

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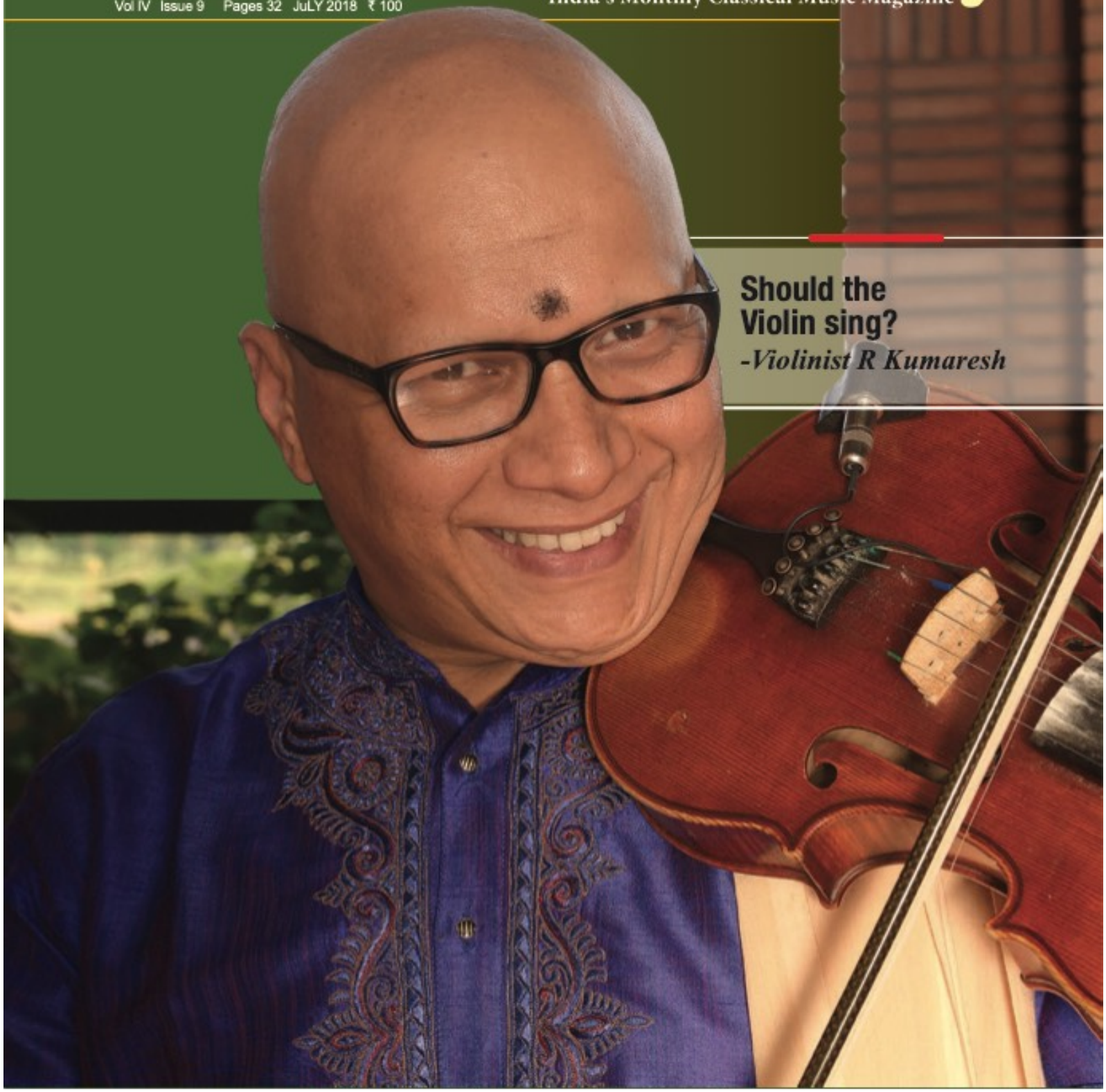
India's Monthly Classical Music Magazine



Should the Violin sing?

-Violinist R Kumaresh

Subha Mudgal at Samagana festival

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Chairman & Managing Editor
R R Ravishankar

Editor
Aparna M Sridhar

Photography
Deepak G Pawar (Bengaluru)
H.K.Rajashekar (Chennai)
CR Venkatesh (Bengaluru)

Cover and Page Design
Sinchana Graphics, Bengaluru

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Aparna M Sridhar
Editor

Dear readers,

On our cover this month is violinist and composer R Kumaresh, who is a passionate advocate of instrumental music, urging listeners to a musical experience that can go beyond the human voice and the lyric.

Learning to think freely in music, from his childhood, Kumaresh has tried to express the sound of the violin in the Carnatic idiom by creating compositions that explore not just traditional pieces but also the immense possibilities of the violin beyond traditional formats. His belief in the need for a new pedagogy for the Carnatic violin has translated into teaching his students to compose new music for their chosen instruments. Kumaresh shares interesting insights on the relationships between structure and freedom; tradition and modernity; musicianship and performance, and indeed, a life in balance.

The Saturday preceding World Music Day on June 21, the Indian cricket team defeated Afghanistan in the latter's first ever Test, at the Chinnaswamy Stadium in Bengaluru. The test match ended in two days, leaving Man of the Match, India's opening batsman Shikhar Dhawan a couple of free days to catch up with friends in Bengaluru.

Dhawan had met Ghatam Giridhar Udupa on a flight some time ago. When he learnt Udupa was a musician, "what do you play," he had asked, giving Udupa an indication of possible musical interest. And indeed, it turned out that Dhawan had been learning to play the Bansuri for over three years, over Skype, with a Hindustani musician Venugopal S Hegde, from Karnataka.

An ardent conversation followed, with plans to keep in touch. And so, the day following the early end of the Test match, the two caught up at Udupa's house. Dhawan played the Bansuri and tried the Ghatam under Udupa's tutelage. World Music Day coincides with World Yoga Day, with Sports not far off, evidently. Enjoy the exclusive pictures in this issue!

Happy reading,

Aparna M Sridhar

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Doctors say: Play babies Mozart in the womb, not Adele

A new study has found foetuses prefer listening to classical music over contemporary pop songs.

ADELE

Research by fertility doctors shows that overall, babies prefer listening to classical music than pop songs in the womb.

Beethoven's 'Ode to Joy' from his Symphony No. 9 and Bach's Sonata for flute, among others, elicited the happiest responses.

Meanwhile, songs like Adele's 'Someone Like You' and Queen's 'Bohemian Rhapsody' saw the lowest level of response.

Scientists at the Institute Marques in Barcelona studied the mouth and tongue movements of over 300 unborn babies, aged between 18 and 38 weeks.

The foetuses were exposed to a range of 15 songs which fell into the following categories: classical, traditional world music, and pop or rock.

Classical music caused the greatest level of reaction (84 per cent), followed by traditional music (79 per cent) and pop or rock music (59 per cent).

MOZART

Researchers said it is very unusual for these movements to happen during the second and third trimesters of pregnancy without a stimulus such as music.

Unborn babies don't react well to Adele's 'Someone Like You'. Picture: Getty

The study proves that music is capable of stimulating neurological activity, triggering areas of the brain linked to language and communication.

Dr. Marisa López-Teijón, Director of Institut Marquès, told The Telegraph: "Music is a form of ancestral communication between humans, the communication through sounds, gestures and dances preceded the spoken language.

"The first language was more musical than verbal, and it still is; we still tend instinctively to speak in a high pitched voice, because we know that newborn perceive those better, and this way they understand that we want to communicate with them."

Dr López-Teijón's team also tried playing classical music to embryos which have undergone IVF fertilisation.

They said it increases chances of success by up to five per cent.

How Carnatic musicians experience **Earworms**

By Dr Suman Srinivasan

All of us have experienced Earworms also known as Brainworm, Sticky music, Stuck song syndrome, Involuntary Musical Imagery (INMI), the catchy piece of music that continually repeats through our mind long after it is no longer playing. At times, "Earworms can be maddening - those songs that get stuck, playing over and over in one's head, says Clinical psychologist Dr.David. J.Ley.

Often commercial jingles or snippets could turn into strong earworms. Some songs we actually like can behave as earworms – sometimes they are snippets of song we may not like. Dr. Srini Pillay- M.D. contributor to Harvard Health Publishing School, says, "Earworms are very catchy tunes mostly unwanted; that repeat in your head. They are relentless tunes which usually play in a loop in upto 98% of the population in Western world. Two-thirds of people say either earworms are neutral or positive, the remaining find it very negative because the tunes are wriggling; annoying and no doubt disturbing. More so, they enter into brain's memory centers; and set up a home threatening inner peace".

Prof. H.S.Ashok, Chairman, Department of Psychology, Bengaluru University says that normally all our conscious behaviour is influenced by sensory organs operating within limits. "Subliminal reference to registering of sensory stimulus below the threshold for which one may not consciously attend, is brought to conscious level at the slightest cue."

Often, creative ideas emerge from earworms. Dance and Vocal facilitator and tutor for over 30 years, Geetha Anantanarayana says she would experience earworms in positive sense when she began her career as dance teacher. "If I composed a new tune for a dance step I would keep getting the tunes often in my head. But now, since I have lot of familial tensions, I don't experience Earworms at all." This is in contrast to Dr Shubha Madhu, Clinical psychologist and Counsellor, who says that despite being a musician for over 30 years, she has not experienced earworms, and "have never had a catchy voice disturbing me".

Researcher Vicky Williamson, Goldsmiths, University of London, found from an uncontrolled study he conducted on earworms, that "Earworms co-related with musical exposure, but can be triggered by experiences that trigger a song (involuntary song), seeing a word that reminds one of the song, hearing a few notes from the song, or feeling or emotions one associates with the song. Songs which I experimented upon had no particular pattern, but were very popular."

Research studies prove 98% of individuals usually experience earworms. Women and men experience the phenomena equally. Yet, earworms tend to last longer for women more. Very interestingly, researcher Kellaris quotes "Upto 73.7% of earworms are based on lyrics, while only 7.7% of Instrumental music can cause earworms.

Dr. Shantala Hegde, in-charge of Music Cognition Lab, Assistant Professor, NIMHANS says Earworms are brainworms. The triggers are many. "Earworms can be triggered by a melodic line, can go on in the background, while we are engaged in some other activity. Earworm should be examined on a continuum rather than good or bad, adaptive or maladaptive behavior. Lyrics, tempo-emotional content – all these properties matter in the causation of Earworm. Individuals with better pitch perception seem to experience Earworms. Studies do show fast tempo music, emotional content can matter in experiencing Earworms. Song repetitions, popularity, number of times we get to listen to it voluntarily or involuntarily are added factors," adds Hegde.

Researchers also believe experiencing Earworms varies from one individual to another based on personality traits. Classical Vocalist Gayathri Venkatraghavan says, "I don't have Earworms (of general tunes) too often, since I listen to

classical all the time. However, I do have a particular raga or krithi stuck in my head sometimes. At those times, I rather let it be and enjoy it."

Classical Carnatic musicians often have ragas buzzing in their heads. Rajalakshmi Gopala Iyengar, a music teacher and facilitator for over 30 years says she has one or the other tune or raga playing all the time. I accept it, I enjoy it, I also have a very happy feeling that my soul requires that tune or raga or phrase as a soothing medium".

Priyadarshini, Playback singer and classical artiste says that as a playback singer when she gets to sing or listen to some unique rare melodious songs she has experienced earworms, and phrases and nuances get stuck in her head and go into the repeat mode. "During my free time, I choose to enjoy this phenomena and during my professional time I convert the same Earworm to learn and sing the new tune instantly during recordings".

According to Ira Hyman Professor of Psychology Western Washington University- "Earworms are not most annoying tunes or songs always. Recent hearing, unfinished thought process, may tend to stay active. If the song really gets stuck, only solution is get cognitively engaged that eats up your consciousness; or just listen to another piece of music you like to get it started."

Prof T S Satyavathi, renowned scholar, music tutor says if she wants to get out of a tune or raga, she simply sings another tune with the same

intensity and emotion. "When I repeat this exercise several times, there is an auto-suggestion without one's knowledge, each tune is as good and haunting, as the other and there is no reason, why one should be haunted by any?"

Assitant Prof. Dr. Naresh Keerthi, vocal musician and a researcher in cognitive linguistics, says he would frequently get tunes from the compositions of Muthuswamy Dikshitar. "Earlier, I used to repeatedly remember a phrase from Muthuswamy Dikshitar's krithi, or a

When I repeat this exercise several times, there is an auto-suggestion without one's knowledge, each tune is as good and haunting, as the other and there is no reason, why one should be haunted by any?"

Prof T S Satyavathi

tune. But now, I can easily play whatever I want due to advancement in technology. When Krithis were played in Radio programmes or particular slots in Doordarshan, I used to experience more of Earworms than now. Ofcourse, now I am assured I can get connected to any krithi anytime, in Youtube easily."

An estimated 90% of people fall prey to earworm at least once in a week mostly they may not be bothersome; but can cause some anxiety and distress. Despite the earworms ubiquity very little is

Cognitive neuroscience of Earworms reveals many insights into how musical information is processed, remembered, rehearsed internally and committed to long term memory. A great deal of research has been done into the musical characteristics of what makes a song, tune or phrase stick in one's mind, however, the larger question as to whether Earworms are culturally determined remains unanswered.

- Dr. Deepti Navaratna

Research on Earworms

At Dartmouth College, David Kraemer and colleagues investigated the phenomenon using functional magnetic resonance imaging (fMRI). As reported in the journal Nature in March 2005, the team discovered that when participants listened to a song or song fragment, fMRI showed activation of a brain region called the left primary auditory cortex, which is the region associated with hearing.

This brain region was also activated when participants thought of the song or tried to make up parts of the songs that were not played. This suggests that an earworm may be "fed" by the memory mechanism of the auditory cortex.

An example of a memory system in this brain region is the "phonological loop." The auditory complex lies in the frontal lobe, the brain area associated with verbal short-term memory and one way in which researchers have described the phonological loop is as a "short loop of recording tape that continuously stores a small amount of auditory information."

The majority of auditory information is either saved in the form of long-term memory or forgotten, but songs seem to be retained in the form of short-term memory over a greater length of time.

Repetition Theory and Cognitive Itch

At the University of Cincinnati, a study by James Kellaris suggested that the reason the short-term memory endures earworms could be that some songs have certain features that stimulate the brain to react abnormally. These properties that capture the brain's attention could subsequently cause the brain to play the song again in the loop.

Kellaris also found that rather than this repetition resulting in the song being removed from the loop, it extends the presence of the earworm, thereby producing the cognitive itch. Kellaris presented these findings at the Proceedings of the Society for Consumer Psychology Winter 2003 Conference in New Orleans.

Interestingly, researchers have found that musicians or people who report that music is a major part of their life, are more likely to experience earworms on a frequent basis. This supports Kellaris's theory about repetition, since musicians often have to employ repetition as part of perfecting their musical skills.

known about how one reacts to the phenomena.

The American Psychological Association define Earworms to be usually a faster, fairly generic, easy to remember melody with some particular intervals, leaps or repetitions, which sets them apart from average music. Studies of Earworms can help one to understand several brain functions like perception, emotions, memory and spontaneous thoughts.

Dr. Deepti Navaratna, Expert Cognitive NeuroScience and Director Indira Gandhi National Institute of Fine Arts opines, "Cognitive neuroscience of Earworms reveals many insights into how musical information is processed, remembered, rehearsed internally and committed to long term memory. A great deal of research has been done into the musical characteristics of what makes a song, tune or phrase stick in one's mind, however, the larger question as to whether Earworms are culturally determined remains unanswered. As for as Indian classical music is concerned, most musicians are aware of how certain Raga phrases are replayed internally after a practice session ends. It is highly likely that symmetry, certain intervallic structures or distinct gamakas can be behind the retention and replay of certain ragas or phrases."

As compared to extensive research about Earworms in Western Music, Indian Classical Music has had very little research in this area. Having said that, repetition of a bhajan melody, repetition of a phrase from a krithi, lingering of a alapana from a particular raga, sticking of a swara prasthara in a musician's brain are positive reinforcements for a Saadhaka.

(The author is a psychologist, vocalist and freelance writer)

Why some songs get stuck in your head

Almost all of us get songs stuck in our heads from time to time but why do certain tunes have the 'stick factor'?

The first large-scale study, led by Dr Kelly Jakubowski at Durham University, may have some answers to this musical stickiness.

Bad Romance

The study has shown that songs that get stuck in your head – called earworms or involuntary musical imagery – are usually faster, with a fairly generic and easy-to-remember melody but with some unique intervals such as leaps or repetitions that set it apart from the "average pop song".

Prime examples of earworms named in the study include Bad Romance by Lady Gaga, Don't Stop Believing by Journey and perhaps not surprisingly Can't Get You Out Of My Head by Kylie Minogue.

Radio time

It is often assumed that songs that get more radio time and have more

recently featured in the charts are more likely to be reported as earworms. The current study has also confirmed this idea by testing it scientifically for the first time.

However, there has previously been limited evidence about what makes the actual song catchy regardless of popularity or how often people may have heard it.

Writing a 'sticky' song

Lead author Dr Kelly Jakubowski from the Department of Music at Durham University, said: "Our findings show that you can to some extent predict which songs are going to get stuck in people's heads based on the song's melodic content. This could help aspiring song-writers or advertisers write a jingle everyone will remember for days or months afterwards.

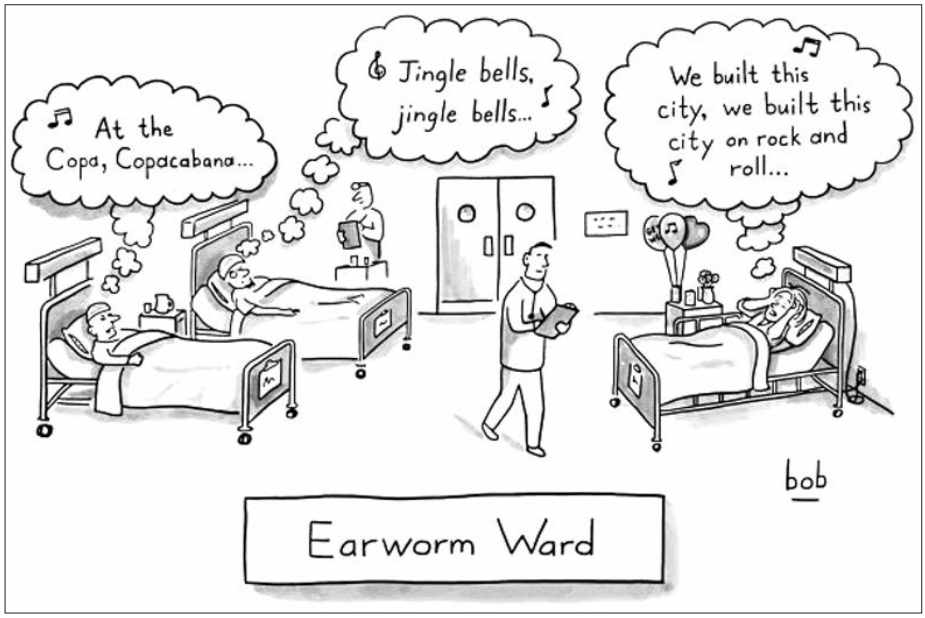
"These musically sticky songs seem to have quite a fast tempo along with a common melodic shape and unusual intervals or repetitions like we can hear in the opening riff of Smoke On The Water by Deep Purple or in the chorus of Bad Romance by Lady Gaga."

The study, published in the academic journal Psychology of Aesthetics, Creativity and the Arts, was conducted by researchers based at Durham University, Goldsmiths, University of London and the University of Tübingen in Germany with funding from the Leverhulme Trust.

Twinkle twinkle little star

The current study found that the tunes most likely to get stuck in people's heads were those with more common global melodic contours, meaning they have very typical overall melodic shapes commonly found in pop music.

An example of one of the most common contour patterns in Western music is that heard in Twinkle Twinkle Little Star where the first phrase rises in pitch and the second falls. Numerous other nursery rhymes follow the same pattern making it easy for young children to remember. The opening riff of Moves Like Jagger by Maroon 5, one of the top-named earworm tunes in the study, also follows this common contour pattern of rising then falling in pitch.



In addition to a common melodic shape, the other crucial ingredient in the earworm formula is an unusual interval structure in the song such as some unexpected leaps or more repeated notes than you would expect to hear in the "average pop song". The instrumental riff of My Sharona by the Knack and In The Mood by Glen Miller both have this unusual interval structure.

Private musical screensaver

Dr Jakubowski, who conducted the research whilst based at Goldsmiths, University of London but has since joined the Department of Music at Durham University, added: "We already know that recent and frequent exposure to a song makes it more likely to get stuck in your head and people who sing and listen to music a lot tend to get earworms more often than others.

"We now also know that, regardless of the chart success of a song, there are certain features of the melody that make it more prone to getting stuck in people's heads like some sort of private musical screensaver."

The researchers asked 3,000 people for their most frequent earworm tunes and compared these to tunes which had never been named as earworms in the database but were a match in terms of popularity and how recently they had been in the UK Music Charts. The melodic features of the earworm and non-earworm tunes were then analysed and compared. Songs were limited to popular music genres, such as pop, rock, rap, rhythm & blues.

Keeping the brain busy

Studies of earworms can help to understand how brain networks, which are involved in perception, emotions, memory and spontaneous thoughts, behave in different people.

Ninety per cent of us get a song stuck in our heads playing on an endless loop at least once a week. It normally happens at times when the brain is not doing much such as in the shower, whilst walking or doing chores.

As well as recent and frequent exposure to songs, words, images or other associations can also dig up a song in our brains out of nowhere and lead it to play in our mind over and over again.

The data for the study was collected from 2010 to 2013.

❖

22 Shruti-Science – *A guide*

Dr.Vidyadhar Gopal Oke,
MD

Indian music always boasted of 22 notes between a Saptak for over 2000 years or ever since the time of Dattila and Bharata. All the ancient and modern researchers agreed in principle for 22 shrutis but gave different positions. Although the world started 'measuring' notes in 'Hertz' since 1930, Indian Music teachers and gurus still prefer tradition over science, wrongly feeling that the science may be derogatory to the great tradition. The fact is on the contrary. The Science of 22 shrutis enriches our tradition by providing a 'Gold standard' of 12 notes to be selected from 22. Having originated from a Veena (a string) by a 'natural' distribution, they cannot be a subject of individual opinion. That should suffice to dispel any prejudice in our mind about 22 shrutis.

A brief introduction to the 'Science of 22 shrutis' follows.

1) What is the difference between 'Nada', 'Shruti', and 'Swara'?

'Dhwani' means 'sound' of any kind. 'Musical' Dhwanis become 'Nadas'. e.g., A clap is a Dhwani, but a bell gives a Nada. Each Nada is a measurable frequency in Hz. There are innumerable 'Nadas' on a string. Out of them, 22 define the 'limits of the 12 notes' on a string, meaning, the perception of each of them 'changes' only at these 22 places (see Slide). These special and naturally fixed Nadas become 'Shrutis'. Further, out of these 22, those 'selected' in a composition/raga become the 'Swaras'. Thus,

- **All sounds in the world are : 'Dhwanis',**
- **Musical Dhwanis are : 'Nadas', (innumerable),**
- **Nadas selected by Nature are : 'Shrutis', (22)**
- **Shrutis selected for Ragas are : 'Swaras'. (3-12)**

2) Why are Shrutis 22 only?

'Only' 22 Shrutis evolve naturally from 1 Shadja as shown in the following diagram.

It can be seen that S and P have 1 single point (Bindu), hence they are called as 'Achala'(Immovable). The remaining 10 notes have a 'region' e.g., the 1st note 'r' has a region extending from 1-2. Playing the string at any point in-between 1-2 is perceived as 'r' only. This region is called as 'Swarakshetra'. However, the perception of 'r' changes only in the 'beginning' (point 1) and in the 'end' of the region (point 2), making these 2 shrutis identifiable by the ear. Thus, 2 'microlimits' of 10 notes (r, R, g, G, M, m, d, D, n and N) provide 10 X 2 = 20 shrutis. With 1 each for S and P, this adds up to 22 shrutis.

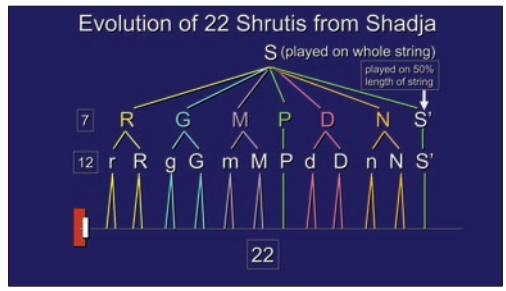
3) **Are 22 shrutis different in Hindustani and Carnatic systems and on Veena, Sitar, Sarod, Violin and Sarangi etc?**

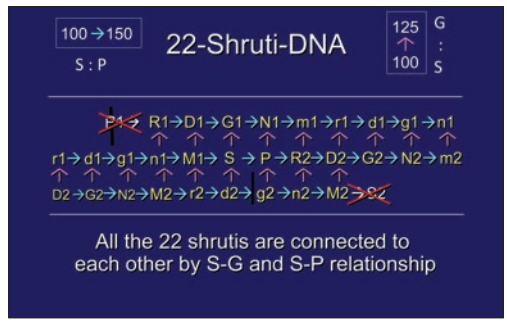
No. The 22 shrutis on the string are absolutely the same both systems. What is different is just the style of singing/playing with difference in emphasis, order, design and the timing used for both Shrutis and connecting Nadas, all giving a different flavour. Further, the % distances to play 22 shrutis remain absolutely the same, irrespective of the instrument, shruti (Shadja), string, place or even player. That is the beauty of nature!

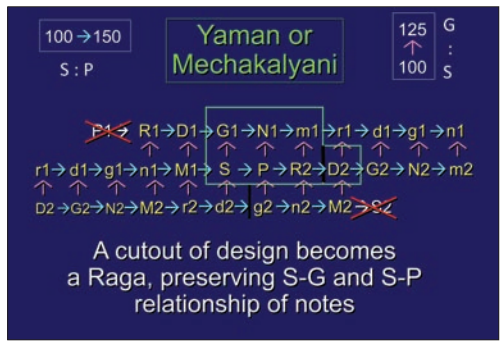
The table explains why the older Carnatic stalwarts mentioned 6 versions each for Rishabham, Gandharam, Daivatham and Nishadam.

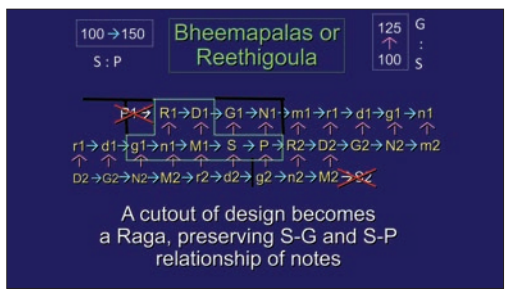
4) Do we use 'only' 22 shrutis in Indian Classical Music ?

No, we use both 'Shrutis' and 'Nadas'! Shrutis are used for '> 45 mSec' (time taken by the ear to 'identify' a note), and for 'connecting









the Shrutis' Nadas are used for '< 45mSec'. 'Alankara' or a 'Gamaka' have 2 or more 'identified' Shrutis in any phrase of a raga, and the in-between connecting Nadas are only 'heard', but 'not identified'!

5) What is the structure of 22-Shruti-Harmonium?

22-Shruti-Harmonium has 4 reeds under every key, 2 each for 'lower' and 'higher' shrutis, operated by a knob. Pulling the knob outside plays

Swara	Hindustani Shruti	Carnatic synonym	Carnatic Name	% length of string to play shruti
Rishabha	r1	R1(lower)	Eka-sruthi Rishabham	**94.92**
	r2	R1(higher)	Dvi-sruthi Rishabham	**93.75**
	R1	R2/G1 (lower)	Tri-sruthi Rishabham or Suddha/Eka-sruthi Gandharam	**90.00**
	R2	R2/G1 (higher)	Chatu-sruthi Rishabham or Suddha/Dvi-sruthi Gandharam	**88.88**
Gandhar	g1	R3/G2 (lower)	Pancha-sruthi Rishabham or Sadharana/Tri-sruthi Gandharam	**84.37**
	g2	R3/G2 (higher)	Shat-sruthi Rishabham or Sadharana/Chatu-sruthi Gandharam	**83.33**
	G1	G3 (lower)	Anthara/Pancha-sruthi Gandharam	**80.00**
	G2	G3(higher)	Shat-sruthi Gandharam	**79.01**
Madhyam	m1	M1(lower)	Suddha/Eka-sruthi Madhyamam	**75.00**
	m2	M1 (higher)	Suddha/Dvi-sruthi Madhyamam	**74.07**
	M1	M2 (lower)	Prathi/Tri-sruthi Madhyamam	**71.11**
	M2	M2 (higher)	Prathi/Chatu-sruthi Madhyamam/Chyuta Pancham Madhyamam	**70.23**
Pancham	P	P	Panchamam	**66.66**
Dhaivat	d1	D1(lower)	Eka-sruthi Daivatham	**63.28**
	d2	D1(higher)	Dvi-sruthi Daivatham	**62.50**
	D1	D2/N1 (lower)	Tri-sruthi Daivatham or Suddha/Eka-sruthi Nishadam	**60.00**
	D2	D2/N1 (higher)	Chatu-sruthi Daivatham or Suddha/Dvi-sruthi Nishadam	**59.25**
Nishad	n1	D3/N2 (lower)	Pancha-sruthi Daivatham or Kaishiki/Tri-sruthi Nishadam	**56.25**
	n2	D3/N2(higher)	Shat-sruthi Daivatham or Kaishiki/Chatu-sruthi Nishadam	**55.55**
	N1	N3(lower)	Kakali/Pancha-sruthi Nishadam	**53.33**
	N2	N3 (higher)	Kakali/Shat-sruthi Nishadam/ Chuyta Shadja Nishadam	**52.67**
Shadja	S'	S'	Shadjam	**50.00**

the 'higher' shruti (except Shadja and Pancham); otherwise playing the 'lower' shruti. We can therefore, 'select' the shrutis as required in a Raga. 22-Shruti-Harmonium is the only instrument in the world today providing a 'Gold standard' for 22 shrutis both for tuning other instruments and also for accompaniment.

6) Why should we not use regular (European tuning) harmonium?

All the 12 notes on European Harmonium are in wrong (unnatural) position, because they each increase by 5.94631 % in frequency over the previous note. This vitiates all the natural notes on the string as shown below.

Swara	Hindustani and Carnatic		European 12-Tone Equitempered Scale
	Lower	Higher	
r	5.35	6.66	5.95
R	11.11	12.50	12.25
g	18.51	20.00	18.92
G	25.00	26.56	25.99
M	33.33	35.00	33.48
m	40.625	42.38	41.42
P	-	50.00	49.83
d	58.02	60	58.74
D	66.66	68.75	68.18
n	77.77	80.00	78.18
N	87.50	89.84	88.77
S	-	100	100

The % Hz above Shadja are given in the table.

7) 22-Shruti-DNA and creation of Ragas.

All the notes in Ragas must be related to each other only by the natural Samvad (Consonance), shown by S-G, S-M, S-P and S-D ratios. This is made possible by the availability of 22 shrutis. My design shown below explains the natural S-G and S-P relationship of all 22 shrutis.

Any part, cut out from the above design, becomes an individual Raga !

It can be appreciated that, Yaman uses 'Chatusruthi' versions of Rishabham and Daivatham vs 'Tri-sruthi' versions in Reethogoula, because in Yaman,

Chatu-sruthi Rishabham : Prathi Madhyamam : Chatu-sruthi Daivatham = S : G : P (100:125:150), whereas in Reethigoula, Kaishiki Nishadam : Tri-sruthi Rishabham : Suddha Madhyamam = S : G : P (100:125:150).

8) Where will we find more knowledge about 22 Shrutis?

- **Website : www.22shruti.com**
- **FREE App : for downloading from Google Playstore for Android phones namely, '22 Shrutis in 500 Ragas'.**
- **Books (See website).**
- **Introductory 4-hour personalized Course (See details on website).**

Summary

22 shrutis are the frequencies (microtones) to be used for 12 notes in Indian Classical Music, with connecting Nadas. Shrutis are the natural microlimits for 12 notes on the string in a Saptak (Octave). They show S-G (100:125) and S-P (100:150) relationship within them, provide an origin for Ragas, and maintain a Samvad (Consonance) in all Raga-notes.

Music lessons can improve language skills

Study links piano education with better word discrimination by kindergartners

-Anne Trafton | MIT News Office

Many studies have shown that musical training can enhance language skills. However, it was unknown whether music lessons improve general cognitive ability, leading to better language proficiency, or if the effect of music is more specific to language processing.

A new study from MIT has found that piano lessons have a very specific effect on kindergartners' ability to distinguish different pitches, which translates into an improvement in discriminating between spoken words. However, the piano lessons did not appear to confer any benefit for overall cognitive ability, as measured by IQ, attention span, and working memory.

"The children didn't differ in the more broad cognitive measures, but they did show some improvements in word discrimination, particularly for consonants. The piano group showed the best improvement there," says Robert Desimone, director of MIT's McGovern Institute for Brain Research and the senior author of the paper.

The study, performed in Beijing, suggests that musical training is at least as beneficial in improving language skills, and possibly more beneficial, than offering children extra reading lessons. The school where the study was performed has continued to offer piano lessons to students, and the researchers hope their findings could encourage other schools to keep or enhance their music offerings.

Yun Nan, an associate professor at Beijing Normal University, is the lead author of the study, which appears in the Proceedings of the National Academy of Sciences the week of June 25, 2018.

Benefits of music

Previous studies have shown that on average, musicians perform better than non musicians on tasks such as reading comprehension, distinguishing speech from

background noise, and rapid auditory processing. However, most of these studies have been done by asking people about their past musical training. The MIT researchers wanted to perform a more controlled study in which they could randomly assign children to receive music lessons or not, and then measure the effects.

"If children who received music training did as well or better than children who received additional academic instruction, that could a justification for why schools might want to continue to fund music," Desimone says.

The 74 children participating in the study were divided into three groups: one that received 45-minute piano lessons three times a week; one that received extra reading instruction for the same period of time; and one that received neither intervention. All children were 4 or 5 years old and spoke Mandarin.

After six months, the researchers tested the children on their ability to discriminate words based on differences in vowels, consonants, or tone (many Mandarin words differ only in tone). Better word discrimination usually corresponds with better phonological awareness — the awareness of the sound structure of words, which is a key component of learning to read.

Children who had piano lessons showed a significant advantage over children in the extra reading group in discriminating between words that differ by one consonant. Children in both the piano group and extra reading group performed better than children who received neither intervention when it came to discriminating words based on vowel differences.

The researchers also used electroencephalography (EEG) to measure brain activity and found that children in the piano group had stronger responses than the other children when they listened to a series of tones of different pitch. This suggest that a greater sensitivity to pitch differences is what helped the children who took piano lessons to better distinguish different words, Desimone says.

"That's a big thing for kids in learning language: being able to hear the differences between words," he says. "They really did benefit from that."

In tests of IQ, attention, and working memory, the researchers did not find any significant differences among the three groups of children, suggesting that the piano lessons did not confer any improvement on overall cognitive function.

Aniruddh Patel, a professor of psychology at Tufts University, says the findings also address the important question of whether purely instrumental musical training can enhance speech processing.

"This study answers the question in the affirmative, with an elegant design that directly compares the effect of music and language instruction on young children. The work specifically relates behavioral improvements in speech perception to the neural impact of musical training, which has both theoretical and real-world significance," says Patel, who was not involved in the research.

A new approach to film music

Priyadarshini School of Music Foundation – PRISM offers one of India's first diplomas in popular music, and allows students studying at MS Ramaiah University, Bengaluru, to learn 'popular music' along with their professional degrees.

Founded by Ram, a Chemical Engineener, PRISM has a music school and recording studio situated inside MS Ramaiah University Campus, Mathikere, Bengaluru. His daughter, Priyadarshini has teamed up with musician Mahesh Mahadev to compile a structured and systematic teaching syllabus for popular music along with Indian classical and western music.

The 'Applied Popular Music' course is offered as an Open Elective Subject at MS Ramaiah University for Undergraduate Degree Students. Furthermore, from 2018-19 academic year 'Popular Music' will be also offered as Diploma Course in MS Ramaiah University.

Priyadarshini grew up in Singapore, learning Western music as well as Indian classical music. While pursuing her Engineering degree, she got an opportunity to sing her first movie song duet with veteran singer Hariharan for the Tamil film 'Kadhal Dot Com' for Music Director Bharadwaj. She has sung 100 movie songs so far, sharing the stage with singers SP Balasubramaniam, Hariharan and Yesudas.

Soon after, Priyadarshini's family relocated to India from Singapore after she completed her Bachelor's Degree in EEE from Nanyang Technological University to pursue her musical interests. She obtained her Master's Degree in Carnatic Music from University of Madras.

"After working with leading music directors for many movie songs, I realised there was a huge difference in studying music and its practical application. A thought kept lingering in my mind to bridge the gap between music education and its practical application. I felt this can be made possible only by imparting a new method of learning."

Priyadarshini feels there is a need in today's film context for an institution to offer Film Music Education. "Many Institutions focus on teaching merely different types of film songs to strengthen the skills of film singing. But one needs to understand mic facing techniques, voice control, diction, notation writing, ear training skills, right vocal production, and proper breathing techniques apart from just learning songs. A musician or singer needs to be knowledgeable theoretically and practically in today's technology advancement scenario."

Of course there are many who dismiss formal training for film music, and believe that no vocal exercise is required for film singing. "There is prevailing thought in general about film music that swaras are not present in it. Many feel that only students undergoing classical training will have this knowledge. But the true fact is whether it is film music, Ghazals, Bhavgeet, Classical Composition or Western music the basic structure of the song is the combination of swaras or musical notes. Thus there is a need for an institution to offer quality Film Music Education," says Priyadarshini.

Pursuing her PhD on "Music in Tamil and Kannada Films - A Study" in University of Mysore under the guidance of Dr CA Sreedhar, Priyadarshini says her thesis covers the period from the beginning of Tamil and Kannada cinema to the present day which includes Film Songs, Background Score, Prominent Music Directors, Playback Singers, Lyricists, Recording System and Music Business.

(PRISM Foundation: www.prismfoundation.org)

Raga Discovery

Mahesh Mahadev is a multi-faced musician and has experimented with music. Speaking about raga discovery, a subject close to his heart, he says, that raga invention is not new, and at regular intervals musicians have through their raga discoveries "created a proper pathway in the evolution of our musical system."

He quotes the background of different ragas. "Raga Malkauns has been credited to Parvati to calm Lord Shiva, when the lord was outraged and not calming down after Tandav in rage of Sati's sacrifice. Miyan Tansen had his own form of Malhar, known as Miyan Malhar. It is believed that when Tansen sang Raag Malhar, it led to unexpected changes in nature, resulting in thunderous clouds and rain falling down from the sky. Harikesha Muthaiah Bhagavathar is credited with having invented Raag Niroshta and is said to have composed a song when the Mysore Maharaja was unwell with swollen lips! Dr M Balamuralikrishna has discovered 'Mahati', 'Siddhi', 'Omkaari', 'Ganapathi' and others."

Mahadev says that raga invention is beyond words, thoughts and imagination. It is impossible to think and create raga music as it happens spontaneously according to the situation. "I can say that it just happened to me and when I researched a particular melodic phrase which came to my mind in ancient books, I could not find it," says Mahesh Mahadev.

"I have discovered classical ragas which are pure Janya Ragas - Mukthipradayini, Bhimsen, Raja Saadhaka, Sri Skanda, Mayakara, Binduroopini, Ayonija, Tapaswi, Meenakshipriya and others. I have also composed Hindustani Bandishes, Carnatic krithis, Sanskrit devotional songs and filmy and western songs with creative themes in these particular ragas and others."

Mahadev's latest creation - 'Mukthipradayani' and his composition was presented in 91st Annual Musical Conference and Concerts, Chennai Music Academy by Hindustani vocalist Jayateerth Mevundi. His other raga creation 'Raja Saadhaka' in the name of India's Great Scientist 'Padmashri' Dr.Y.S. Rajan was presented for his English song to India's renowned Industrialist 'Padmabhushan' Dr. Tarun Das

In an attempt to bring classical music and film music on the same stage, Mahadev organised the "Geet Bandish Milan" show along with Mevundi and Priyadarshini. It featured famous bandishes and Raga based popular film hits. Mevundi presented many bandishes in ragas Pilu, Adana, Yaman, Sivaranjini and many more. Priyadarshini sang Hindi, Tamil, Kannada, Telugu, Malayalam hits in the same raga. At the climax of the show there was an exchange of genres between the artists. Priyadarshini sang Hindustani Bandish 'Gaana Vidya' in which she rendered the taans. Mevundi in his turn performed a filmy classical song duet 'Mere Dholna Sun' along with Priyadarshini.

Mahadev's creation, Raag Bhimsen is dedicated to and named after Mia Tansen (SEN) and'Bharat Ratna' Pandit Bhimsen Joshi (BHIM) of the Kirana Gharana tradition. This Raag is derived from Kokilpriya Thaat of Chaithanya Kunte's 24 Thaat System and derived from Bhairavi Thaat of Bhatkhande's 10 Thaat System. It is an Audav-Sampoorna Raga. Mahadev has written two Bandishes - Vilambit and Drut in Hindi and composed them in Roopak and Teen Taal. These Bandishes are rare as this is the first time a Bandish has been written and composed in praise of Lord Venkateshwara. "I wanted to take South Indian elements to North Indian music," says Mahadev.

In Hindustani Classical Music, the usage of Kokilpriya Thaat is very rare and the melodic phrases of the Bandish are unusual and sounds very different. A 45 - 50 min audio is slated for release very soon on Audio Label PM Audios.

World Music day Special

shikhardofficial: Amazing start to the week. Learning one step at a time. Patience and practice are the key. With my friend @ghatamudupa bhai here who is a great Ghatam player. Hope everyone has a great week.

Should the Violin sing?

"The perfo the musici

rmer is bound, an is free…."

By Aparna M Sridhar

Violinist and composer R. Kumaresh dedicates his musical composition named after the greatest superhero in Indian mythology, Anjaneya, to all those who are "free-spirited and are stretching their boundaries again and again. All of us are a reflection of *Anjaneya* in our own way, moving through this beautiful experience of life, facing challenges, conquering our own set boundaries -- and all of us are devotees in our own way."

Photos: Deepak G Pawar

Kumaresh (Right) with Ganesh at their first concert in Chennai

Clearly, these are cherished values. The 2017 released Ragamalika - *'The Flights of Anjaneya'* brings together Kumaresh's inspirations while growing up listening to different genres of music, while trying to capture his musical imaginations in the Carnatic idiom. "My dreams, my expressions, my expansions, my experience and my musical joy is represented in this musical flight," he told *The First Melody* in an interview in Bengaluru.

Indeed, the musical journey of Kumaresh and his older brother Ganesh has been one of freeing their minds from the known. A path that was shown to them by their father and guru T S Rajagopalan. He taught them the idiom when Kumaresh was just 3 years old and Ganesh was 5, but would allow them to find their own way. "He would tell us to learn *Sahana Varnam,* play it and learn a song in it. He wouldn't correct me when I

“Carnatic music is contemporary music, even though it is traditional. Today, in our day-to-day lives we follow a traditional culture but our thought processes are very contemporary

played but would do it later. Once you’re trained to think freely, the universe is the limit. We have to discipline the mind to be free,” says Kumaresh.

In Carnatic music, the framework is set by the raga and tala and every generation has its own way of understanding aesthetics and dynamics. Every generation wants to enjoy the same music differently. “Carnatic music is contemporary music, even though it is traditional. Today, in our day-to-day lives we follow a traditional culture but our thought processes are very contemporary. There is no contradiction between our music and our lives. We seamlessly connect between modernity and tradition.”

While prescient about the direction Carnatic music could take, Kumaresh and Ganesh were cautious

while presenting their music in traditional venues. Whereas in their other innovative concerts, the brothers introduced the concept of Vadhi Samvadhi (called harmony in the West) way back in 1990s. When one violin started on a sa, (the root note of the raga), the other would start on a *pa* or *ga* (an interval of a third or fifth), and if the first violin moved to *ri* (the second stop of the raga scale), the other would play a *dha* depending on

Developing a Musical Mind

By R Kumaresh

Music is by far the most energised and optimised form of expression. It is the perfect reflection of unity in diversity.

As a practitioner and performer - one feels the unification of one with the sound (Unity).

As a listener, the experience leaves each one with unique yet different experiences - but the music is the same. For some it is Bhakti, for some it is Bliss, for some it is technical, for some it is Mathematical etc. (Diversity)

Many scientific studies have shown that listening to Music helps in the optimisation of human possibilities.

A musical mind is what one must aspire to have.

To be that, one need not be a practitioner of the art.

Being musical is a step upwards to being spiritual.

A Musical mind comprises of these very key elements

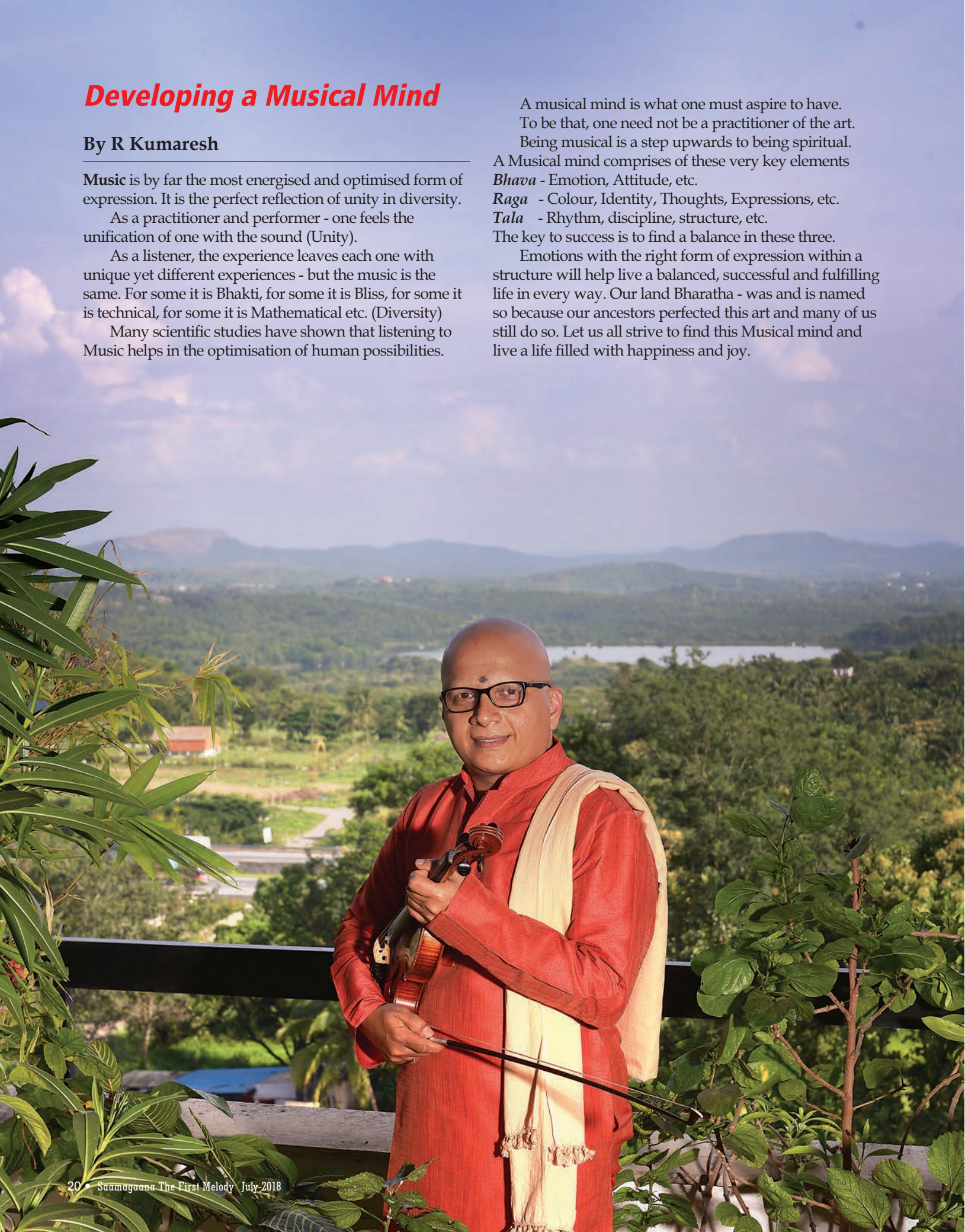
Bhava - Emotion, Attitude, etc.

Raga - Colour, Identity, Thoughts, Expressions, etc.

Tala - Rhythm, discipline, structure, etc.

The key to success is to find a balance in these three.

Emotions with the right form of expression within a structure will help live a balanced, successful and fulfilling life in every way. Our land Bharatha - was and is named so because our ancestors perfected this art and many of us still do so. Let us all strive to find this Musical mind and live a life filled with happiness and joy.



the raga. This clearly differed from normal practice in a standard sabha kutcheri. Starting from a Varnam in Mohanam, the Vadhi Samvadhi concept was explored to the fullest by the brothers in their concerts. While it may have been perceived as Western music by some music critics, the underlying sophistication and prodigious skill of the brothers proved their music was ahead of their time.

Experimentations in Carnatic music, especially in instrumental music, have frequently been dismissed with the epithet 'fusion music' by traditionalists to whom the *krithi* defines the genre. To Kumaresh, fusion music is NOT just about a random group of musicians playing their own genre of music and jamming, and calling it fusion just because there is a presence of the drums or keyboard. It is a joint collaboration of new music and new ideas, creating a new sound together, where each artiste comes out of their bubble and stretches their boundaries to present something new. For sure the sound that is produced is attractive, and Kumaresh says for youngsters at the age of 18-22, it provides a multiple kaleidoscope of sounds. Examples of this can be found in their much acclaimed albums - *Spark, Carnatic Chills, Colours of India,* Seasons – to name a few.

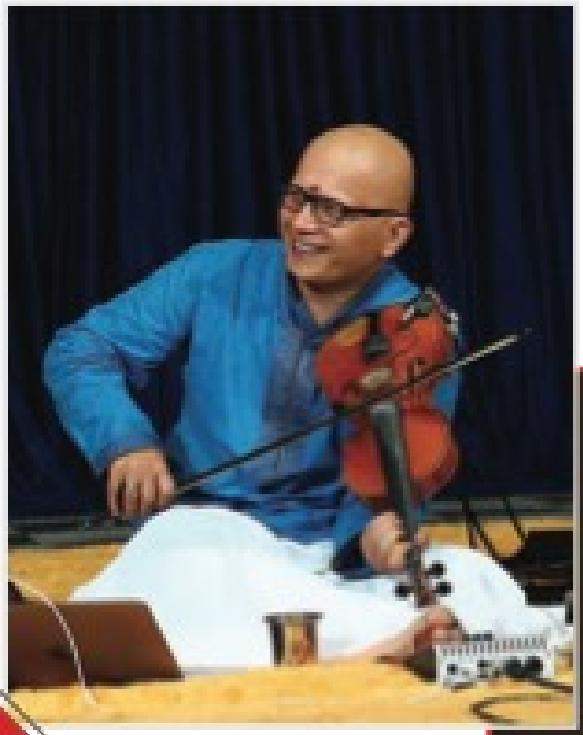
Many youngsters appreciate these contemporary music albums. "The Carnatic idiom has so much scope to explore and create many new things within the boundaries of Raga and Thala. It is up to the musician in you to reach out and discover it," says Kumaresh.

Kumaresh's first concert was at the age of five and music has always been about seeking experiences rather than accumulating knowledge. "*Kalyani ragam* alone is worth several years of exploration. Today when I play a *Kalyani,* the ideas and parameters I set myself are different from what I did 46 years ago. There have been years of experience just practicing that sound. Being part of that kaleidoscope of *Kalyani,* what is that raga, how do you move between *ri* and *ga*. How can I make it different and express myself through that. That is what changes."

In his early 20s, *Kalyani* would reveal herself through the sangathis of the great masters. "That would inspire me and I would repeat those sangathis. But today when I play, it is my experience, my expression, my identity because of the practice that has gone in. It is not knowledge, it is the experience of the practice in internalising it, till *Kalyani* becomes your core. How you understand that sound becomes most important. You need a good guide and you need to expand yourself both inside and outside," says Kumaresh.

The roles of performer and musician are not always in sync. "Whenever I am performing, I enjoy the musician experience more than the performer experience. In the performer experience there is always a framework or boundary which I fix, whereas the musician is totally free. I can't let go in a concert platform. There is a responsibility given to me which I have to follow. I will express my creations but I will try and reach out to the audience."

Kumaresh refers to a particular concert with Ganesh which was dedicated to veena maestro Dr S Balachander. The brothers played the entire concert based on the concept of Grahabeda. Taking the ragam Kalyani, from "*sa*" they played a composition in *Kalyani*. From "*ri*" they played a composition in Sahana. Like this, for each note in *Kalyani,* they played a piece in the ragam that would be derived with "*ga*" as the tonic note, then "ma" as the tonic note and so on.



“When we have such an immense option of exploring ragas in different dimensions, why do we look at it uni-dimensional? I found myself restricted when I had to look at music through the prism of just words

Saamagaana Live

Flights of Anjaneya by R Kumaresh

Technically, this is a super complex theme to choose, whose difficulty can only be understood by a performer. Interestingly, most of the audience were not clued onto what was happening on stage. Kumaresh says that all innovations need not necessarily be for the audience! Their album *Shadjam* is replete with *grahabedam*. "Doing *grahabedam* on an instrument will show you, if you equip yourself technically, how much you can do within the music."

Once they were travelling to Thanjavur along with Thavil vidwan Haridhwaramangalam Palanivel. Palanivel was discussing a complicated *koraipu* with another thavil player and to Kumaresh and Ganesh it presented a challenge they couldn't pass. The brothers decided to try it on stage that very same day, but did not follow it verbatim. They improvised on that idea. Kumaresh says, "When many good ideas pass your way, it should inspire you to improvise on it and should not be followed exactly. Because the moment you copy it exactly, you become a caricature of that. You may like it a lot, but it doesn't become YOUR expression."

Multi-dimensional approach to music

Carnatic music has always had a strong leaning towards Bhakti rasa, so much so that even the other eight of the *navarasas* are portrayed through the lens of Bhakti. To Kumaresh, however, music should reflect the myriad emotions of human experience. While Bhakti is very important, he says, there are many more emotions that can be expressed through the musical notes of a raga.

When Kumaresh plays Mayamalavagowlai, it's the notes that linger in him, rather than Meru *Samana* or *Tulasi dala*. There are instrumentalists who have come up to him and told him that they were not able to think of music in terms of the instrument, and only as a reflection of the voice. "That is the way they have identified their music, which is good in terms of what it is. But, as a consequence, we have not used a huge canvas of musical expression by not listening to the instrument," says Kumaresh.

The brothers have explored Mayamalavagowla through their composition called Maya which showcases the raga *Swaroopa* in its fullest glory.

"When we have such an immense option of exploring *ragas* in different dimensions, why do we look at it uni-dimensionally? I found myself restricted when I had to look at music through the prism of just words.

Violin - an ancient Indian instrument

The Dhanur Veena, which is possibly the origin of the modern day violin, is probably the only instrument that has the capacity to expand and extend the boundaries of the art form because of its inherent qualities. To say that it is the most advanced in terms of its technique is an understatement. Many legendary musicians have explored and expanded the scope of the instrument by their sheer brilliance in not only the way they use the instrument but also how they expanded their musical mind to bring out the various dimensions of the instrument.

In fact, there is hardly a concert today without the violin being a part of the same either as a solo instrument, an accompanying instrument or as a lead instrument in fusion or film music based programmes. Since it is used in such a multi dimensional platform the technology to play the instrument has also expanded according to necessity.

Technique is a tool used to understand and unravel a subject. It is an accessory which helps one in identifying the complexities of the subject and the ways

to over come and conquer those areas .

To communicate our musical ideas through an instrument we need an optimized technique of both the right and left hands. Right hand to communicate the various moods and dynamics of the sound, emotions of the instrument and the music. The Left hand to show case the precise positions and musical contours of the raga and the musical melody. Right hand optimises the rhythmic dimension while the left hand optimises the musical flavour.

Because they are in different languages which I may not resonate with. I felt that I could explore music beyond words. That was the reason we started composing instrumental melodies. Ragapravaham is about communicating the multi-dimensional component of music through an instrument," says Kumaresh.

The learning of Carnatic music is such that one can practice for several hours a day for several years and not even scratch the surface of the art form, feels Kumaresh. "You may learn many krithis and many ragas, which you will keep playing and performing for several decades. There will be a point where the inner YOU will be screaming to express itself in a form beyond all that you have learnt and performed so far. That part of me was a force within me, even when I was a 10 year old, where I would create my own *sangathis* and play them. My father never restricted me or my brother from trying out what we wanted to do. Those were my opportunities to find that connect and experience myself," says Kumaresh.

Most of the compositions in Carnatic music are, utmost, in two octaves. In his early years, Kumaresh often felt that there's more to music than expressing the raga beyond just these two octaves. "The violin has four octaves. When am I going to explore that? I can do so many wonderful things on the instrument on the lower octave. I can do so many things on the instrument on the higher octave. I can traverse from one octave to another, I can glide through. There are so many possibilities. That is when you start composing," says Kumaresh.

In their teens, the brothers would listen to all kinds of music. When Kumaresh was 15 and Ganesh 17, they were playing *Ninnu Vina* in Navarasa Kanada. They heard Beethoven's 6th symphony at about the same time. "Listening to that we composed something in *Navarasa Kanada* as Vadi Samvadi notes. So *anna* would play one note of Navarasa Kanada, the

Training for instruments

It would be wonderful if the system of teaching Carnatic music also included in its syllabus, separate exercises to improve felicity and smooth transition from one octave to the other. "All the basic lessons taught in our system focuses mainly on one and half octaves. If they were specific exercises to improve speed, *brighas* and the tenor of the voice, our vocal students would be able to sustain their voice and perform in a good standard until late in their lives. That way, the Hindustani system of teaching focuses a lot on *shruti-shuddham* and voice culture," says Kumaresh.

Similarly, in the lessons for instruments, the same exercises that are taught in vocal is followed verbatim. There are no special exercises that introduces the students to the dynamics and possibilities that the instrument presents. Which is why, I have created a bank of compositions for each level to teach my students. This helps them learn to travel the length and breadth of the instrument, traversing four octaves on the violin. Once the technique is in place, the students are empowered to play anything their mind can conceive, because they have created that bond with the instrument," says Kumaresh.

If things have not been tried out or if people are averse to experimenting, he adds, "it is the limitation of the artiste not the art form. It's the limitation of the people within the framework of the system. Once you are comfortable doing something, you don't want to try anything else. Today Carnatic music is appreciated world over so why would anyone want to change."

Whenever Kumaresh feels an urge to play something new, he composes a new melody. Interestingly he has also composed many songs with lyrics in Tamil, which are popularly sung in the concert scene today. If the new composition is an instrumental Ragapravaham, there is sure to be a streak of adventure, flamboyance, streak of skill, streak of instrumentation, and most importantly, the most optimised expression of that raga.

Kumaresh – the *Fiddling Monk*, who is known to be adventurous during his concerts, has a soft corner for these instrumental compositions. Much as he loves to render the masterpieces/krithis which he does with flamboyance, he can often be found lost, in his flights of fantasy, exploring ragas and creating newer superheroes, just like his *"Flights of Anjaneya"*.

“While the beauty of Gamakas is unparalleled in Carnatic Music, the importance of plain notes is unsurpassable as they are the building blocks to create a strong foundation to a shruti-shudham rendition, be it in voice or on instrument.

same thing I would play in a different note in the same musical meter. We wanted to play it on stage but we didn't have the courage to do it at that time because it was too radical," says Kumaresh.

For the brothers, their creation of Ragapravaham was an explosion of musical ideas which showcased the various tones of the Violin, various shades of the raga and the innovation of the musician who composed it. "For us life is about limitless opportunities. It's more important to reinvent oneself and evolve, or you will get bored with yourself," says Kumaresh.

Kumaresh emphasises on the importance of plain notes in teaching and practice. While the beauty of Gamakas is unparalleled in Carnatic Music, the importance of plain notes is unsurpassable as they are the building blocks to create a strong foundation to a shruti-shudham rendition, be it in voice or on instrument.

He says, "While you cannot have a better identity for Carnatic music than the Gamaka, it is very important that gamakas can be introduced to a student after the fourth or fifth year of learning music. Till such time they should play only shuddha swaras. Only then will they understand the tonal position and the sound of each note."

Put on a happy song

Researchers find that listening to happy music may enhance our ability to be creative.

By Tim Newman
Medical News Today

Could happy music enhance creativity?

The importance of creativity needs no introduction; without it, science, technology, the arts, business, and education would all grind to a halt.

In a world of ever-increasing complexity, approaching problems with insight and innovation is vital. But some researchers believe that, as a society, we are becoming less creative as the decades pass.

If this is the case, it could be a serious stumbling block for future generations facing the wealth of challenges involved in a postmodern society.

Recently, two teams of researchers - one from Radboud University in Nijmegen, the Netherlands, and another from the University of Technology Sydney in Australia - joined forces to investigate a simple way of influencing creativity: listening to music.

Their intriguing results are published this week in the journal PLOS ONE.

Over the years, a number of studies have looked at whether listening to music enhances cognitive performance, and the so-called Mozart effect is still debated. However, studies looking at whether or not music can influence creativity are few and far between. The authors of this most recent study explain their focus.

The current project aims to shed light on the potential association of music listening for optimizing creative cognition. This project is unique as, to the best of our knowledge, it is the first to experimentally test whether listening to specific types of music [...]

facilitates creative cognition."

Investigating music's impact on creativity

The researchers, led by Simone Ritter in the Netherlands and Sam Ferguson in Australia, recruited 155 participants.

Firstly, they filled out a questionnaire to assess their current mood. Next, they were split into five experimental groups, four of which would be presented with different pieces of music while the fifth (the controls) was presented with silence. The pieces of music were classified by mood and arousal state:

Calm (low arousal): Carnival of the Animals: XIII. The Swan by Camille Saint-Saëns

Happy (high arousal): The 4 Seasons, Opus 8, Number 1, RV 269, Spring - Movement 1. Allegro by Antonio Vivaldi

Sad (low arousal): Adagio for Strings, Opus 11 by Samuel Barber

Anxious (high arousal): The Planets: Mars, Bringer of War by Gustav Holst

Once the music had begun, the participants were asked to complete a range of cognitive tasks testing levels of divergent and convergent creative thinking.

The authors explain divergent thinking as "producing multiple answers from available information by making unexpected combinations, recognizing links among remote associates, or transforming information into unexpected forms." In other words, a relatively creative process.

Convergent thinking is more logical and produces the best single answer to a given problem, meaning that it is considered to be a less creative process, in general.

Vivaldi encourages innovation

Individuals who came up with the most innovative and useful solutions to the tasks were rated higher in divergent creativity, while those who came up with the best possible solution got marks for convergent creativity.

The team found that listening to happy music, compared with silence, increased divergent creativity but not convergent creativity.

The authors explain that one model of creativity describes it as a marriage of persistence and flexibility, and that listening to happy music may boost one of these two parameters. Because convergent creativity was not improved, it may be that happy music enhances mental flexibility, and, therefore, creativity.

The study opens up a vat of new questions to be answered, and there are a range of variables that could be tinkered with, such as the influence of cultural background, age, and musical experience.

Also, volume levels and musical genres could play important roles. Because music is such a simple and cheap intervention, these findings could have sizable ramifications in education, science, and business alike.

The results will need to be replicated in larger trials, but it is somewhat pleasing to consider that someone's creative musical outpouring may enhance another individual's ability to be creative.

Confluence of Melody and Math

Abhishek Raghuram keeps youngsters on their toes

> “Hypothesise that Raga Lalita hadn’t existed. How different would be your presentation of *māyāmāḷavagouḷa,* specially around the *panchama-varjya* phrases? Would such a *māyāmāḷavagouḷa* be possible for an artiste to present and be acceptable to the listener? Has the lack of similar Janya Ragas for *kalyāṇi* or *tōḍi* influenced the acceptable phraseology for them? Has the existence of *haṁsavinōdini* as a known Janya of *śankarābharaṇa* led to a different *śankarābharaṇa* experience for us?”
>
> “At a steady *kālapramāṇa,* why does an exercise attempting to gradually increase the naḍai’s per akṣara result in a loss of distinction after a certain threshold? Is it possible to mathematically explain this result?”

By Arun and Meenakshi Subramanian

These were few among the numerous questions that provoked thought at Carnatic vocalist Abhishek Raghuram’s ‘Carnatic Camp’ which recently concluded in Bangalore. A workshop specifically designed for budding and practising young musicians, it was among the rare occasions of the luminary taking to the blackboard, in a truly didactic form. Twelve intense hours of musical instruction and interaction with Abhishek Raghuram, spread over a full day and a long afternoon summed it up for the participants who were unwilling to leave. Alongside education and inspiration, experiencing the maestro’s innate abilities as a teacher of the finest order was a pleasant revelation for the attendees.

The camp had an ambitious agenda. Effective and efficient practising techniques utilising basic exercises, honing creativity, introduction to rhythm, developing composition vocabulary leading to manōdharma capabilities of rāga exposition, neraval, svarakalpana and pallavi singing at the introductory level were expectedly on the chart. Unsurprisingly, the master performer pushed the envelope taking on an even larger spectrum. Guided listening, philosophies of scalar and phrasal ragas and explorative exercising found their places in his presentation. All devices of effective teaching — analogies, adages, anecdotes, enunciation, exploration, exposition, experimentation, exercises, egging on and humour — were abundantly put to use in a fluent, extempore but an utterly undaunting manner by Abhishek Raghuram. Idioms used were replete with mathematical parlance, calling in sets, limits, matrices and algorithms to drive home the points. As the camp ended, participants left equipped with a repertoire of ideas and objective exercises to develop abilities in all the charters.

Diversity of the discussed topics, dexterity of the emphasised approaches and the variety of the explored exercises underscored the singular spirit of analysis and inquiry which have already characterised Abhishek Raghuram's identity as a celebrity musician. For the participants, it was also an education in eagerness and sincerity necessary for a keen student. As the maestro energetically talked and tiptoed for hours, students were on their toes to absorb and marvel at the novelty of the thoughts, approaches.

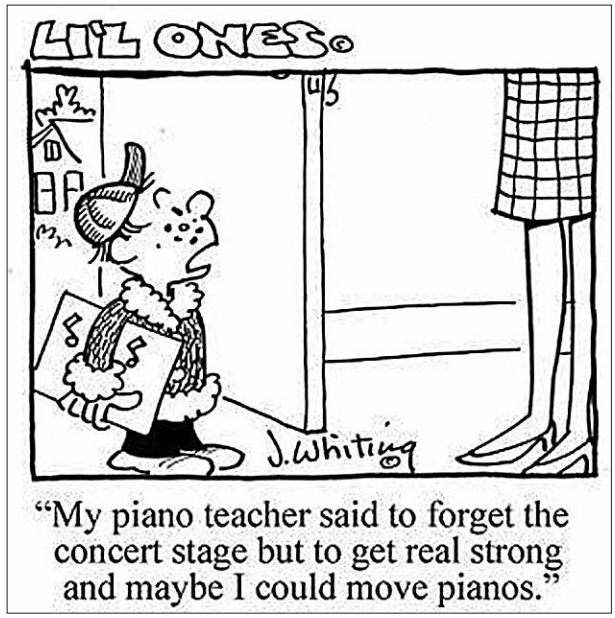
Breaking down the routine and mundane to meaningful and impactful devices of learning appeared to be Abhishek Raghuram's forte. Examples were ample in the seemingly short duration the camp provided. For instance, one of the exercises posed to the participants was to device their own versions of dāṭu varisai svara patterns. Discovered extempore,

another exercise called for altering three swara sequences at regular locations to other appropriate ragas in a newly created dāṭu varisai sequence otherwise set in māyāmāḷavagouḷa.

Format of this camp was also an unusual one even in its choice of location. Cosy ambience of a home lent itself superbly to tear down the formal setup. Maestro's most unassuming and inspiring manners were palpable to not only the participants but also to the hosts and facilitators.

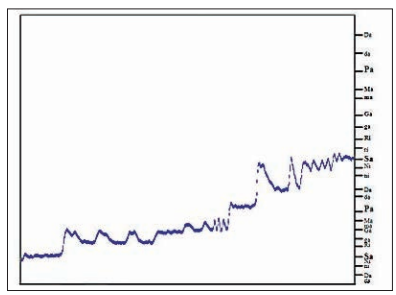
❖

Cartoon



GAMAKA FACTS

Chief Gamakas summarised in Candida Connolly's book – Indian Melodies for the Violin



Kampita: or shake (a gentle oscillation between two neighbouring notes);

Nokku: descending pull (approaching a note with a slide from a semitone above);

Pratyahata: strike back (a mordent, where a note drops to the next note down, then goes back up again);

Sphurita: throbbing (here a note is repeated, and the second receives a mordent);

Etrajaru and Irakkajaru: an upward and a downward slide respectively;

Orikkai: or snap is a little like an Irish cut or a klezmer kretschs - the note is interrupted by a flick of a higher note;

Ravai: or brief repetition (a note is preceded by itself and the next note down);

Oddukal: or note pushed aside (here a note is briefly interrupted by the previous note in the phrase)

Aruna Sairam at Samagana festival

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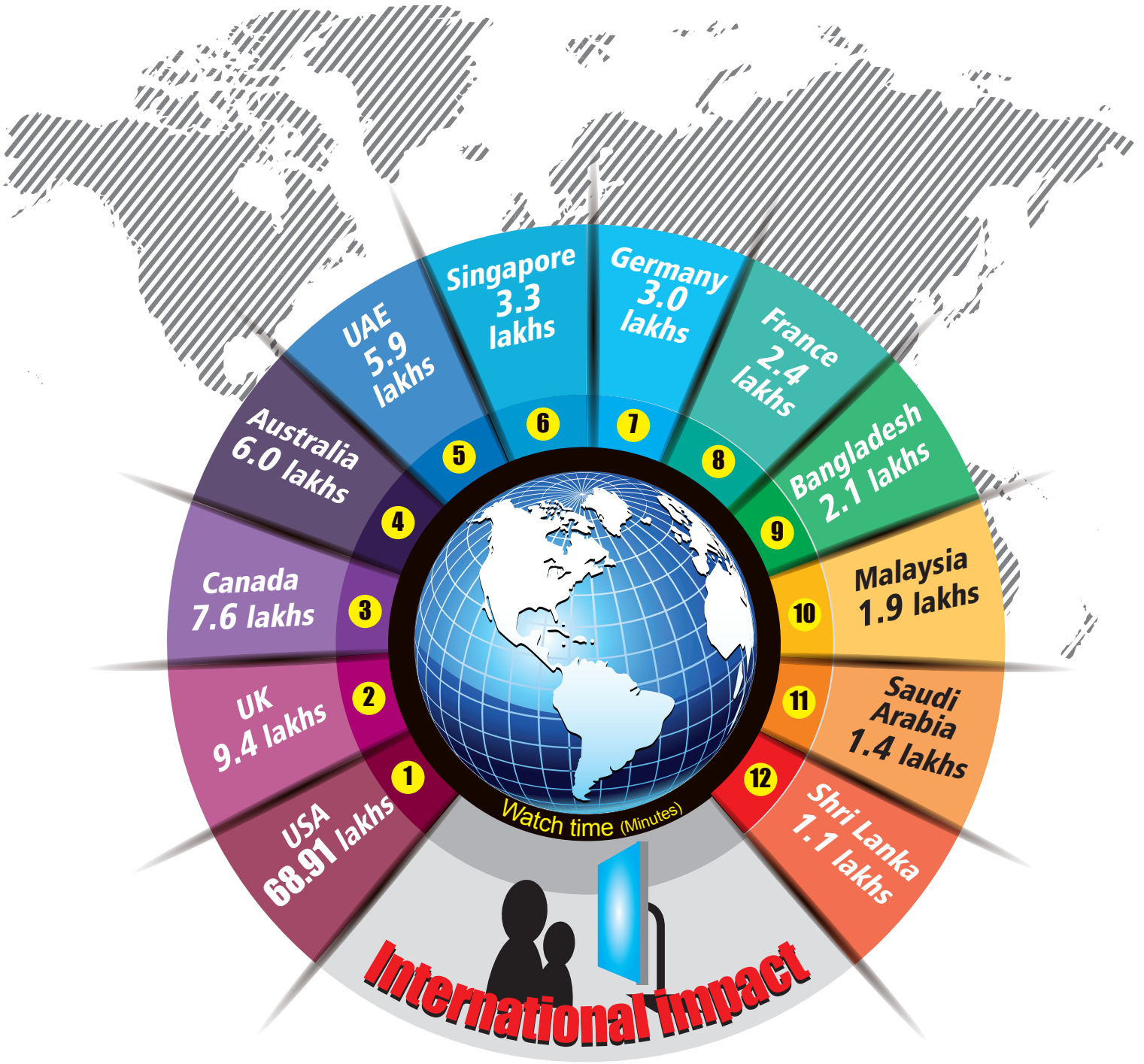
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